



CLAIMS (IN AMENDED FORM)

1. (Currently Amended) A method of assaying molecules in a sample comprising the steps of:

providing a sample that contains one or more target molecules or molecular complexes;

contacting said target with one or more probes under conditions which permit the formation of a target-probe complex, wherein the probe comprises one or more magnetic labels;

subjecting said target-probe complex to an applied magnetic field so as to induce magnetization; and

~~determining one or more magnetic characteristics by measuring and characterizing a magnetic signal of said target-probe complex induced by said applied magnetic field in any one or more of (1) time response, called magnetic swing time, (2) spatial orientation, and (3) to determinine a hysteresis loop as is solvable for (3a) saturation magnetization, (3b) remnant magnetization and (3c) coercive force and (4) magnitude so as to, by action of the determining, identify any of the presence, location, orientation and quantity of the target-probe complex, and thus also of the one or more target molecules or molecular complexes.~~

2. (Original) The method of claim 1, wherein said target molecule or molecular complex is disposed on a support.

3. (Previously Amended) The method of claim 2, wherein said target molecule or molecular complex is disposed on the support in an array.

4. (Previously Amended) The method of claim 3, wherein said array is an addressable array.

5. (Currently Amended) The method of claim 1, wherein said one or more probes ~~is~~ are disposed on a support.

6. (Currently Amended) The method of claim 5, wherein said one or more probes ~~is~~ are disposed on the support in an array.

7. (Original) The method of claim 6, wherein said array is an addressable array.

8. (Currently Amended) The method of claim 1, wherein said ~~determining comprises:~~ measuring and characterizing is of the a magnitude of the magnetic signal resulting from magnetization induced in said target-probe complex in response to said applied magnetic field.

9. (Currently Amended) The method of claim 1, wherein said ~~determining~~ measuring and characterizing comprises:

providing a magnetic sensor; and

generating ~~a~~ the magnetic signal with the magnetic sensor in response to ~~said one or more~~ magnetic characteristics of the target-probe complex.

10. (Currently Amended) ~~The A method of claim 9, wherein said~~ of assaying molecules in a sample comprising the steps of:

providing a sample that contains one or more target molecules or molecular complexes;

contacting said target with one or more probes under conditions which permit the formation of a target-probe complex, wherein the probe comprises one or more magnetic labels;

subjecting said target-probe complex to an applied magnetic field so as to induce magnetization;

generating a signal with the ~~magnetic sensor~~ uses a giant magnetoresistive ratio magnetic sensor characteristics in response to the applied magnetic field.

11. (Currently Amended) The method of claim 9, wherein said ~~determining~~ measuring and characterizing comprises:

providing a signal processing means that generates readable output from said signal.

12. (Currently Amended) The method of claim 9
wherein said one or more target molecules or molecular
complexes ~~is~~ are disposed on a support;
and wherein said ~~determining~~ measuring and characterizing
comprises:
moving the support ~~or~~ and the sensor in relation to ~~the~~
each other in one or more directions.

13. (Previously Amended) The method of claim 1, further
comprising:
subjecting said target-probe complex to one or more of a
plurality of applied magnetic fields having different
intensities.

14. (Previously Amended) The method of claim 1, further
comprising:
subjecting said target-probe complex to one or more of a
plurality of applied magnetic fields having different directions.

15. (Cuurently Amended) The method of claim 1, further
comprising:
contacting the one or more target molecules ~~ofr~~ molecular
complexes with a non-magnetic colloid so as to ~~block the magnetic~~
~~signal from the~~ reduce non-specific binding of the one or more
probes to the target molecules or molecular complexes.

16. (Currently Amended) The method of claim 1, further
comprising:
joining the one or more probes to one or more colored beads,
fluorescent beads, or fluorescent cells.

17. (Currently Amended) The method of claim 1, further
comprising the step of detecting the presence of said target-
probe complex by visual, electronic or optical means.

103. (Currently Amended) ~~The A method of of claim 1, wherein~~

~~said determining comprises:~~ assaying molecules in a sample comprising the steps of:

providing a sample that contains one or more target molecules or molecular complexes;

contacting said one or more target molecules of molecular complexes with one or more probes under conditions which permit the formation of a target-probe complex, wherein the probe comprises one or more magnetic labels;

subjecting said target-probe complex to an applied magnetic field so as to induce magnetization; and

measuring and characterizing a time response, called the magnetic swing time, of the magnetic signal resulting from magnetization induced in said target-probe complex in response to said applied magnetic field.

104. (Currently Amended) The method of claim 1, wherein said ~~determining comprises:~~ measuring and characterizing is additionally of a spatial orientation of the magnetic signal resulting from magnetization induced in said target-probe complex in response to said applied magnetic field.

105. (Canceled)

106. (Currently Amended) The method of claim 105 wherein measuring and characterizing of the hysteresis loop also measures and characterizes the ~~saturation~~ spatial orientation of the target-probe complex, and thus said one or more of the presence, location, orientation and quantity of the target-probe complex.

107. (Currently Amended) The method of claim 105 wherein measuring and characterizing of the hysteresis loop also measures and characterizes the saturation magnetization of the target-probe complex, and thus said one or more of the presence, location, orientation and quantity of the target-probe complex.

108. (Currently Amended) The method of claim 105 wherein

measuring and characterizing of the hysteresis loop also measures and characterizes the remnant magnetization of the target-probe complex, and thus said one or more of the presence, location, orientation and quantity of the target-probe complex,

109. (Currently Amended) The method of claim 105 wherein measuring and characterizing of the hysteresis loop also measures and characterizes the coercive force of the target-probe complex, and thus said one or more of the presence, location, orientation and quantity of the target-probe complex.

110. (Previously Added) The method of claim 1, further comprising:

subjecting said target-probe complex to one or more of a plurality of applied electric fields having different intensities.

111. (Previously Added) The method of claim 1, further comprising:

subjecting said target-probe complex to one or more of a plurality of applied electric fields having different directions.

112. (Previously Added) The method of claim 1 wherein the contacting of said target is with one or more probes containing a ferromagnetic material as the magnetic label.

113. (Currently Amended) The method of claim 1 wherein the contacting of said target is with one or more probes containing a ~~ferromagnetic material~~ ferrofluid as the magnetic label.

114. (Previously Added) The method of claim 1 wherein the contacting of said target is with one or more probes containing a paramagnetic material as the magnetic label.

115. (Previously Added) The method of claim 1 wherein the contacting of said target is with one or more probes containing a

superparamagnetic material as the magnetic label.

116. (Currently Amended) A method of assaying molecules in a sample comprising the steps of:

providing a sample that contains one or more target molecules or molecular complexes;

contacting said target with one or more probes under conditions which permit the formation of a target-probe complex, wherein the probe comprises one or more magnetic labels;

subjecting a substantially planar sample of said target-probe complex to an applied magnetic field so as to induce magnetization of the target-probe complex; and

~~determining one or more magnetic characteristics by measuring and characterizing scanning in a raster-scan motion with a magnetic sensor a magnetic signal of said target-probe complex induced by said applied magnetic field in any one or more of (1) time response, called magnetic swing time, (2) spatial orientation, and (3) hysteresis loop as is solvable for (3a) saturation magnetization, (3b) remnant magnetization and (3c) coercive force, and (4) magnitude so as to, by action of the determining, identify any of the presence, location, orientation and quantity of the target-probe complex, and thus also of the one or more target molecules or molecular complexes.~~

117. (Presently Added) The method of claim 116, wherein the determining of the magnetic signal of said target-probe complex induced by said applied magnetic field also determines a time response, called magnetic swing time, of the target-probe complex, and thus also of the one or more target molecules or molecular complexes

118. (Presently Added) The method of claim 116, wherein the determining of the magnetic signal of said target-probe complex induced by said applied magnetic field also determines the spatial orientation of the target-probe complex, and thus also of the one or more target molecules or molecular complexes.

119. (Presently Added) The method of claim 116, wherein the determining of the magnetic signal of said target-probe complex induced by said applied magnetic field determines a hysteresis loop that is solvable for any of (1) saturation magnetization, (2) remnant magnetization, (3) coercive force and (4) magnetic magnitude.

120. (Presently Added) The method of claim 10 further comprising:

determining from the generated signal a time response, called magnetic swing time, of the target-probe complex, and thus also of the one or more target molecules or molecular complexes

121. (Presently Added) The method of claim 10 further comprising:

determining from the generated signal the spatial orientation of the target-probe complex, and thus also of the one or more target molecules or molecular complexes.

122. (Presently Added) The method of claim 10 further comprising:

determining from the generated magnetic signal a hysteresis loop that is solvable for any of (1) saturation magnetization, (2) remnant magnetization, (3) coercive force and (4) magnetic magnitude.

123. (Presently Added) The method of claim 103 wherein the measuring and characterizing is further of the spatial orientation of the target-probe complex, and thus also of the one or more target molecules or molecular complexes.

124. (Presently Added) The method of claim 103 wherein the measuring and characterizing is further of the hysteresis loop of the target-probe complex which hysteresis loop is solvable for

any of (1) saturation magnetization, (2) remnant magnetization, (3) coercive force and (4) magnetic magnitude.

125. (Presently Added) A method of assaying molecules in a sample comprising the steps of:

providing a sample that contains one or more target molecules or molecular complexes;

contacting said target with one or more probes under conditions which permit the formation of a target-probe complex, wherein the probe comprises one or more magnetic labels;

subjecting a substantially planar sample of said target-probe complex to an applied saturation magnetic field in the plane of sample the so as to induce saturation magnetization of the target-probe complex; and

measuring and characterizing with a magnetic sensor a magnetic signal of said target-probe complex induced by said applied magnetic field so as to identify and determine any of the presence, location, orientation and quantity of the target-probe complex, and thus also of the one or more target molecules or molecular complexes.

126. (Presently Added) The method of claim 125 further comprising:

determining from the measured and characterized magnetic signal a time response, called magnetic swing time, of the target-probe complex, and thus also of the one or more target molecules or molecular complexes

127. (Presently Added) The method of claim 125 further comprising:

determining from the measured and characterized signal the spatial orientation of the target-probe complex, and thus also of the one or more target molecules or molecular complexes.

128. (Presently Added) The method of claim 125 further comprising:

determining from the measured and characterized magnetic signal a hysteresis loop that is solvable for any of (1) saturation magnetization, (2) remnant magnetization, (3) coercive force and (4) magnetic magnitude.

129. (Presently Added) A method of assaying molecules in a sample comprising the steps of:

providing a sample that contains one or more target molecules or molecular complexes;

contacting said target with one or more probes under conditions which permit the formation of a target-probe complex, wherein the probe comprises one or more magnetic labels;

subjecting a sample of said target-probe complex to an applied magnetic field the so as to induce magnetization of the target-probe complex; and

measuring and characterizing with a magnetic sensor a magnetic field of said target-probe complex field so as to identify and determine any of the presence, location, orientation and quantity of the target-probe complex, and thus also of the one or more target molecules or molecular complexes.

130. (Presently Added) The method of claim 129 further comprising:

determining from the measured and characterized magnetic field of the target-probe complex a time response, called magnetic swing time, of the target-probe complex, and thus also of the one or more target molecules or molecular complexes

131. (Presently Added) The method of claim 129 further comprising:

determining from the measured and characterized magnetic field the orientation of the target-probe complex, and thus also of the one or more target molecules or molecular complexes.

132. (Presently Added) The method of claim 129 further comprising:

determining from the measured and characterized magnetic field a hysteresis loop of the target probe complex, which hysteresis loop is solvable for any of (1) saturation magnetization, (2) remnant magnetization, and (3) coercive force.

133. (Presently Added) A method of assaying molecules in a sample comprising the steps of:

providing a sample that contains one or more target molecules or molecular complexes;

contacting said target with one or more probes under conditions which permit the formation of a target-probe complex, wherein the probe comprises one or more magnetic labels;

applying a magnetic field to the target-probe complex so as to induce magnetization of the target-probe complex; and

measuring and characterizing with a magnetic sensor the magnetic field of said target-probe complex while forcibly moving the target probe complex relative to the applied magnetic field, therein to determine the magnetic field of the target-probe complex, and thus also of the one or more target molecules or molecular complexes that are part of the target-probe complex.

134. (Presently Added) The method of claim 133 further comprising:

determining from the measured and characterized magnetic field of the target-probe complex a time response, called magnetic swing time, of the target-probe complex, and thus also of the one or more target molecules or molecular complexes

135. (Presently Added) The method of claim 133 further comprising:

determining from the measured and characterized magnetic field the orientation of the target-probe complex, and thus also of the one or more target molecules or molecular complexes.

136. (Presently Added) The method of claim 133 further comprising:

determining from the measured and characterized magnetic
filed a hysteresis loop of the target probe complex, which
hysteresis loop is solvable for any of (1) saturation
magnetization, (2) remnant magnetization, and (3) coercive force.